CLAIMS

1. A method for generating a culture that is purified or enriched in respect of cells of a selected lineage, comprising:-

A (i) introducing into a multipotential cell a selectable marker that is differentially expressed in cells of the selected lineage compared with its expression in other cells;

(ii) culturing the multipotential cell to induce differentiation of the multipotential cell into a cell of the selected lineage or into a mixture of cells including cells of the selected lineage, or to induce preferential survival, in a mixed culture of cells, of cells of the selected lineage; and

(iii) selecting for those cells that express the selectable marker.

2. A method according to Claim 1 for generating a culture that is enriched or purified in respect of progenitor cells of a selected lineage.

3. A method according to Claim 1 or 2 wherein the multipotential cell is selected from embryonic stem (ES) cells, embryonic germ (EG) cells, embryonic carcinoma (EC) cells, a primary culture of foetal cells, a primary culture of post-natal cells, and a primary culture of adult cells.

4. A method according to Claim 1, 2 or 3 comprising genetically modifying multipotential cells to delete, mutate, substitute or add genes in order (i) to assay gene function in progenitor cells of the selected lineage, and/or (ii) to render selected cells more suitable for transplantation.

5. A method according to any of Claims 1 to 4 further comprising:-

(iv) introducing into the multipotential cell a second selectable marker that is differentially expressed in cells of a selected sub-lineage compared with its expression in other cells, wherein cells of the selected sub-lineage are formed by differentiation of cells of the selected progenitor lineage; and

(v) when a culture of progenitor cells of the selected lineage has been obtained, allowing or inducing differentiation of the cells and selecting for cells that express the second selectable marker.

6. A method according to any of Claims 1 to 5 wherein the selectable marker is introduced into the multipotential cell by targeted integration or random gene trap integration so as to be operatively coupled to a gene that is differentially expressed in progenitor cells of the selected lineage.

7. A method according to any of Claims 1 to 5 wherein the selectable marker is introduced into the multipotential cell via random integration of a transgene in which the selectable marker is operatively coupled to a gene that is differentially expressed in progenitor cells of the selected lineage.

8. A method according to any of Claims 1 to 7 wherein the multipotential cell is an ES, EG or EC cell and the method comprises forming an embryoid body, or otherwise inducing differentiation of the cells.

9. A method according to Claim 8 wherein the differentiated cells are dissociated so as to form a culture substantially of individual cells.

10. A method according to Claim 8 or 9 wherein differentiated cells of an embryoid body are dissociated using a protease, such as trypsin.

11. A method according to any of Claims 1 to 10, for generating a culture that is purified or enriched in respect of neural progenitors, comprising introducing into the multipotential cell a selectable marker that is differentially expressed in neural

progenitor cells.

12. A method according to Claim 11 wherein the selectable marker is expressed in cells that express a Sox gene.

13. A method according to Claim 12 wherein the Sox gene is selected from Sox 1, Sox 2 and Sox 3.

14. A method according to any of Claims 1 to 10 for generation of cardiac progenitor cells, wherein the selectable marker is expressed in cells that express the Nkx 2.5 or GATA-4 gene.

15. A method according to any of Claims 1 to 10 for generating a culture that is purified on enriched in respect of haematopoietic progenitors.

16. A method according to Claim 15 wherein the selectable marker is expressed in cells that express CD34, CD44 or SCL.

17. A method according to any of Claims 1 to 16 wherein the selectable marker is an antibiotic resistance gene and the method comprises culture in the presence of antibiotic.

18. A progenitor cell of a selected lineage, obtainable according to the method of any of Claims 1 to 17.

19. A composition comprising a plurality of cells, wherein a majority of the cells are progenitor cells of a selected lineage.

20. A composition according to Claim 19 wherein at least 60% of the cells are progenitor cells of the selected lineage.

~~21. A composition according to Claim 19 or 20, wherein at least 60% of the~~

~~cells are neural progenitor cells.~~

~~22. An isolated neural progenitor cell.~~

23. A method according to Claim 5, for obtaining a culture that is purified or enriched in respect of ventral progenitor cells, wherein the selectable marker is differentially expressed in neural progenitor cells and the second selectable marker is differentially expressed in ventral progenitor cells.

24. A method according to Claim 23 wherein the second selectable marker is differentially expressed in cells that express Pax 6.

25. An assay of the effect of a factor on a culture of progenitor cells of a selected lineage, comprising:-

A (i) introducing into a multipotential cell a selectable marker that is differentially expressed in progenitor cells of the selected lineage compared with its expression in other cells;

(ii) culturing the multipotential cell to induce differentiation of the multipotential cell into a cell of the selected lineage or into a mixture of cells including cells of the selected lineage, or to induce preferential survival, in a mixed culture of cells, of cells of the selected lineage; and

(iii) selecting for those cells that express the selectable marker, and

B culturing the thereby obtained progenitor cells of selected lineage in the presence of the factor.

26. A method according to Claim 25 characterised according to any of Claims 2 to 17.

27. A method according to Claim 25 or 26 to assay whether the factor has a proliferative, maturation, toxic or protective effect on progenitor cells of the selected lineage.

28. A method according to Claim 27 to assay whether a factor has a proliferative, maturation, cytotoxic or glial protective effect on neural progenitor cells.

29. A neural progenitor cell, or a culture comprising a majority of neural progenitor cells, for transplantation.

30. A cell or cells according to Claim 29, wherein the neural progenitor cells are neuronal cells.

31. A cell or cells according to Claim 29 wherein the neural progenitor cells are glial cells.

32. A method of preparing a neural progenitor cell or a differentiated progeny thereof for storage, comprising obtaining the cell in a method according to any of Claims 1 to 17 and freezing the cell in the presence of a cryoprotectant.

33. A method of generating purified neurons, comprising obtaining a culture purified in respect of neural progenitors, using the method of any of Claims 1 to 17 wherein the selectable marker is differentially expressed in cells that express a Sox gene, and culturing the progenitors obtained in the presence of medium suitable for differentiation of the progenitor into neurons.

34. A neural progenitor cell for transplantation to treat neurodegenerative disease or neuronal/brain injury.

35. A neural progenitor cell for transplantation, obtainable from a cell selected from an ES cell, an EC cell, an EG cell, a primary culture of foetal cells, a primary

culture of post-natal cells and a primary culture of adult cells, for transplantation to treat neurodegenerative diseases or neuronal/brain injuries.

36. A method of treatment of neurodegenerative disease or neuronal/brain injury comprising transplantation of a neural progenitor cell.

37. A method of amplifying a purified population of progenitor cells of a selected lineage, comprising

maintaining the cells in culture in the presence of

a mitogen; and

a growth factor.

38. A method according to Claim 37 wherein the progenitor cells comprise a gene coding for a selectable marker, which gene is differentially expressed in the progenitor cells compared with its expression in other cells, and wherein the method further comprises selecting for cells that express the selectable marker.

39. A method according to Claim 38 wherein the method comprises maintaining the culture over a plurality of generations and periodically selecting for cells that express the selectable marker.

40. A method according to Claim 38 wherein the method comprises maintaining the culture over a plurality of generations and continuously selecting for cells that express the selectable marker.

41. A method according to Claim 40 wherein the selectable marker is antibiotic resistance and the method comprises continuous culture in the presence of antibiotic.

add B1 add B7